Date Submitted: 11/04/20 9:58 am

Viewing: **EN-ESC-MS : M.S. in Engineering Science**

Last approved: 08/19/20 3:07 pm

Last edit: 12/10/20 2:32 pm

Changes proposed by: Janice Daniel (daniel)

Catalog Pages Using this Program	M.S. in Engineering Science

Department(s) / College(s)

Department	College
SAET – Eng. Edu. Division (SEED) ~~Office of the Dean (NCE) (DNCE)~~	Newark College of Engineering (EN)

Name of Program	M.S. in Engineering Science
Academic Level(s)	Graduate
Degree Designation	MS
Campus(es) where the program will be offered	Newark

In Workflow

1. **DNCE Chair**
2. **SEED Chair**
3. **AIS**
4. **EN Dean**
5. **Vice Provost of Graduate Studies**
6. **President of the Faculty Senate**
7. Provost's Office
8. Academic Issues Committee

Approval Path

1. 11/04/20 10:01 am Sui-Hoi Edwin Hou (hou): Approved for DNCE Chair
2. 11/05/20 2:59 pm Thomas Juliano (thomas.juliano): Approved for SEED Chair
3. 11/09/20 1:54 pm Mesfin Ayne

CIP Code

Effective Catalog Edition   2021-2022

Related Department(s)

If the change involves altering the department's curriculum paradigm as currently outlined in the NJIT catalog, please attach existing and proposed paradigms.

Articulation with other institutions, if any

Objectives

Briefly summarize the program and indicate its objectives; e.g., the nature and focus of the program, the knowledge and skills students will acquire, any cooperative arrangements with other institutions or external agencies in offering this program, etc.

Need

Provide justification of the need for this program. If the program falls within the liberal arts and sciences and does not specifically prepare students for a career, then provide evidence of student demand and indicate opportunities for students to pursue advanced study (if the degree is not terminal with regard to further education). If the program is career-oriented or professional in nature, then in addition to student demand give evidence of labor market need and results of prospective employer surveys. Report labor market need as appropriate on local, regional, and national bases. Specify job titles and entry-level positions for program graduates, and/or indicate opportunities for graduates to pursue additional studies.

(ayne): Approved for AIS

4. 11/11/20 1:03 pm Kam Moshe (kam): Approved for EN Dean

5. 12/10/20 2:33 pm Sotirios Ziavras (ziavras): Approved for Vice Provost of Graduate Studies

History

1. Aug 19, 2020 by Jessie Tsui (tsui)

Relationship to the University and State Master Plans

Describe the relationship of the program to the following: institutional master plans and priorities.

Relationship to Similar Programs in the State and Region

List similar programs within the state and in neighboring states. How does this program compare to those currently being offered?

Distinguished Programs Nationally

For doctoral programs: Supply a select list of distinguished programs nationally in this discipline.

Students

Estimate anticipated enrollments from the program's inception until a steady state or optimum enrollment is reached.

Resources to Support the Program

Briefly describe the additional resources needed to implement and operate the program during the program's first five years, e.g., the number of full-time faculty, number of adjunct faculty, computer equipment, print and non-print material, etc.

Course
Development
Plan

Names of faculty
involved

Libraries and
Computing
Facilities

Classrooms and
Laboratories
Needs

Catalog Description (For PHD programs, include information about the qualifying exams, and other program milestones.)

Curriculum

Degree Requirements

To ensure academic success in their graduate studies, students may be required to take additional undergraduate or graduate courses before beginning graduate curricula. This program of bridge courses will be individually-designed in consultation with the student's graduate advisor. Such courses are not counted toward degree requirements. **Students interested in pursuing a focus in engineering education can do so through the Master's Thesis or Master's Project option.**
A minimum of 30 credits is required. A thesis or project may be included.
Seminar: In addition to the minimum 30 degree credits, all students who receive departmental or research-based awards must enroll each semester in a graduate seminar. The seminar is selected in consultation with the graduate advisor.

M.S. in Engineering Science (courses only)

	Course List	
Code	Title	Credits
Required		
Two 600-level math courses		6
One 600-level physics, chemistry, or biology course		3
Two 600-level engineering courses		6
Electives 1		

Code	Title	Credits
Select five courses in consultation with graduate advisor		15
Total Credits		30

1The elective credits must form a meaningful and coherent program integrated with the specialization in science or engineering.

M.S. in Engineering Science (Master's project)

Course List		
Code	Title	Credits
Required		
Two 600-level math courses		6
One 600-level physics, chemistry, or biology course		3
Two 600-level engineering courses		6
Project		
Master's project		3
Electives 1		
Select four courses in consultation with graduate advisor		12
Total Credits		30

1The elective credits must form a meaningful and coherent program integrated with the specialization in science or engineering.

M.S. in Engineering Science (Master's thesis)

Course List		
Code	Title	Credits
Required		
Two 600-level math courses		6
One 600-level physics, chemistry, or biology course		3
Two 600-level engineering courses		6
Thesis		
Master's thesis		6
Electives 1		

Code	Title	Credits
Select three courses in consultation with graduate adviso		9
Total Credits		30

1 The elective credits must form a meaningful and coherent program integrated with the specialization in science or engineering.

M.S. in Engineering Science (Master's project, Engineering Education Focus)

Course List

Code	Title	Credits
Required		
MATH 644	**Regression Analysis Methods**	**3**
MATH 661	**Applied Statistics**	**3**
BIOL 660	**College Teaching**	**3**
or BIOL 630	**Critical Thinking for the Life Sciences**	
ESC 705	**Advances in Engineering Education Research**	**3**
Two 600-level engineering courses		**6**
Project		
Master's Project		**3**
Electives 1		
Select three courses in consultation with graduate advisor		**9**
Total Credits		30

1 **The elective credits must form a meaningful and coherent program integrated with the specialization in science or engineering.**

M.S. in Engineering Science (Master's Thesis, Engineering Education Focus)

Course List

Code	Title	Credits
Required		
MATH 644	**Regression Analysis Methods**	**3**
MATH 661	**Applied Statistics**	**3**
BIOL 660	**College Teaching**	**3**
or BIOL 630	**Critical Thinking for the Life Sciences**	
ESC 705	**Advances in Engineering Education Research**	**3**
Two 600-level engineering courses		**6**
Thesis		
Master's Thesis		**6**
Electives 1		
Select two courses in consultation with graduate advisor		**6**
Total Credits		30

1The elective credits must form a meaningful and coherent program integrated with the specialization in science or engineering.

Is licensure required of program graduates to gain employment?

Will the institution seek accreditation for this program?

Add any additional information you would like brought to the attention of CUE/ CGE here

Attach any additional information you would like brought to the attention of CUE/ CGE here: Uploaded Files:

Reviewer
Comments

Date Submitted: 12/02/20 9:03 pm

Viewing: **CC-CS-PHD : PHD. in Computer Science**

Last approved: 02/23/20 5:36 pm

Last edit: 12/02/20 9:03 pm

Changes proposed by: Reza Curtmola (crix)

Catalog Pages Using this Program	Ph.D. in Computer Science

Department(s) / College(s)

Department	College
Computer Science (CS)	Ying Wu Coll of Computing (CC)

Name of Program	PHD. in Computer Science
Academic Level(s)	Doctoral
Degree Designation	PHD
Campus(es) where the program will be offered	Newark

In Workflow

1. **CS Chair**
2. **AIS**
3. **CC Dean**
4. **Vice Provost of Graduate Studies**
5. **President of the Faculty Senate**
6. Provost's Office
7. Academic Issues Committee

Approval Path

1. 12/02/20 9:05 pm
   Baruch Schieber (sbar): Approved for CS Chair
2. 12/03/20 8:00 am
   Mesfin Ayne (ayne): Approved for AIS
3. 12/03/20 10:44 am
   Ali Mili (mili): Approved for CC Dean

CIP Code

Effective Catalog   2021-2022
Edition

Related
Department(s)

4. 12/10/20 2:27 pm
   Sotirios Ziavras
   (ziavras):
   Approved for Vice
   Provost of
   Graduate Studies

If the change involves altering the department's curriculum paradigm as currently outlined in the NJIT catalog, please attach existing and proposed paradigms.

Articulation with
other institutions,
if any

History

1. Feb 23, 2020 by
   Mesfin Ayne
   (ayne)

Objectives

Briefly summarize the program and indicate its objectives; e.g., the nature and focus of the program, the knowledge and skills students will acquire, any cooperative arrangements with other institutions or external agencies in offering this program, etc.

Need

Provide justification of the need for this program. If the program falls within the liberal arts and sciences and does not specifically prepare students for a career, then provide evidence of student demand and indicate opportunities for students to pursue advanced study (if the degree is not terminal with regard to further education). If the program is career-oriented or professional in nature, then in addition to student demand give evidence of labor market need and results of prospective employer surveys. Report labor market need as appropriate on local, regional, and national bases. Specify job titles and entry-level positions for program graduates, and/or indicate opportunities for graduates to pursue additional studies.

Relationship to the University and State Master Plans

Describe the relationship of the program to the following: institutional master plans and priorities.

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Distinguished Programs Nationally

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Students

Estimate anticipated enrollments from the program's inception until a steady state or optimum enrollment is reached.

Resources to Support the Program

Briefly describe the additional resources needed to implement and operate the program during the program's first five years, e.g., the number of full-time faculty, number of adjunct faculty, computer equipment, print and non-print material, etc.

Course
Development
Plan

Names of faculty
involved

Libraries and
Computing

Facilities

Classrooms and
Laboratories
Needs

Catalog Description (For PHD programs, include information about the qualifying exams, and other program milestones.)

Curriculum

Course Requirements

For students entering the program with a Master's degree in Computer Science or related areas, 12-24 credits at the 600 and 700 level (at least 12 credits at the 700 level). The default requirement is 24 credits, but waivers for 600 level courses may be determined in consultation with and written approval by the PhD committee based on the student's prior background in the four areas of the qualifying examinations. At most 6 credits can be Independent Study in Computer Science (CS 725 and/or CS 726). If a student takes two Independent Study courses, then they should be done with two different professors. At least 6 credits must be for lecture-based courses at the 700 level.

For students entering the program without a Master's degree in Computer Science or related areas, 36 credits at the 600 and 700 level. At least 12 credits must be at the 700 level, and out of those at most 6 credits can be Independent Study in Computer Science (CS 725 and/or CS 726). If a student takes two Independent Studies, then they should be done with two different professors. At least 6 credits must be for lecture-based courses at the 700 level.

Doctoral Dissertation Credits
For students who were admitted in the program in the Fall 2015 semester or after, the rules are described at: http://www5.njit.edu/graduatestudies/content/new-phd-credit-requirements/
For students who were admitted in the program before the Fall 2015 semester, students must complete 30 credits of CS 790. A maximum of 6 credits of CS 792 Pre-Doctoral Research may be used toward the CS 790 requirement.

CS 791: Doctoral Seminar

Full-time students are required to enroll in CS 791 every semester. *Full-time PhD students are required to attend 2/3 of the weekly Wednesday departmental seminars.*

Qualifying Examinations

All PhD students are required to take qualifying examinations in **three** ~~four~~ areas.

Course List

Code	Title	Credits
One examinations is in the combined area of:		
CS 610	Data Structures and Algorithms	3
CS 611	Introduction to Computability and Complexity	3

Course List

Code	Title	Credits
Two examinations are in the following areas:		
CS 630	Operating System Design	3
CS 631	Data Management System Design	3
CS 634	Data Mining	3
CS 650	Computer Architecture	3
CS 656	Internet and Higher-Layer Protocols	3
CS 659	Image Processing and Analysis	3
CS 661	Systems Simulation	3
CS 670	Artificial Intelligence	3
CS 675	Machine Learning	3
BNFO 601	Foundations of Bioinformatics I	3
or BNFO 602	Foundations of Bioinformatics II	

PhD students are allowed to take **up to four** ~~five~~ qualifying examinations and are required **to** ~~to~~ pass at least **three** ~~four~~ out of the **four (the combined** ~~five (CS 610 and~~ CS **610 and CS** 611 **examination** must be among the **three examinations** ~~four courses~~ the students pass). If they fall short of the **three examinations in** ~~four examinations on~~ the first year, then they must make **up** ~~up~~ the number of missing **examinations** ~~examinations~~ the second year and may take one more **examination** ~~examination~~ than the number they are required **to** ~~to~~ pass.

Is licensure required of program graduates to gain employment?

Will the institution seek accreditation for this program?

Add any
additional
information you
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CUE/ CGE here

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Reviewer
Comments

Key: 124

Maintenance of Registration
Students enrolled in a degree program who find it necessary to temporarily discontinue their studies are permitted to maintain registration with approvals as noted above, for a fee for each semester they do not register. Master's students may maintain registration for a maximum of two consecutive semesters. Ph.D. students may maintain registration for up to four semesters (consecutive or not) with appropriate justification. Registration holds are placed on students who reach or exceed these limits. Continuation of financial support for Ph.D. students after their return from "maintain registration" is not guaranteed so they should contact their department before deciding to maintain registration. Students working on a MS project, MS thesis or doctoral dissertation are generally not permitted to register for maintaining registration. International students on F-1 and J-1 visa status may not maintain registration unless they have obtained prior written permission from the Global Initiatives Office.

Students who maintain registration are mailed registration notices for the following semester and are not required to reapply for admission. After receiving approval to maintain registration, students must register for "Maintaining Registration" on the course registration website.

Each semester in which registration is officially maintained is not counted in the total time period allotted to complete degree requirements..

Non-Matriculated Studies of NJIT Alumni

NJIT students awarded a degree in Fall 2020 or later can register within seven years after graduation as non-matriculated students to take up to two **graduate** courses without paying an application fee or having their academic record evaluated as long as these courses are in the same discipline with their prior degree and they satisfy course prerequisite requirements. This policy applies to alumni having upon graduation a minimum CGPA of 2.8 for their undergraduate, 3.3 for their master's or **certificate**, or 3.5 for their Ph.D. studies at NJIT.

Publications of PhD Students ---- Statistics
(data collected for the group of 35 most recent graduates)

Publication Statistics per student *(only published papers and papers accepted for publication are included)*

- Average, all (journal+conference) publications: 6.34
- Average, journal publications (per student): 2.69
- Average, conference publications: 3.66
- Median, journal publications: 2
- Median, conference publications: 3
- Median, all (journal+conference) publications: 6
- Maximum, journal publications: 11 (two students had this max)
- Maximum, conference publications: 20
- Maximum, all (journal+conference) publications: 24
  (one student had this max. Others followed with 17, 14, 13, 11, 10, 10, …)
- Min, all publications: 0 (two students had this min)

Total number of publications for the group of 35 students:
- 222 journal and conference publications
  - 94 journal publications
  - 128 conference publications
  (more papers may be published due to pending acceptance decisions)